



Ring-billed gulls at nesting colony at Burke Lakefront Airport, Cleveland, Ohio, May 1995. Photo by T. W. Seamans.

## Nest disturbance techniques to control nesting by gulls

*Sheri K. Ickes, Jerrold L. Belant, and Richard A. Dolbeer*

**Abstract** Urban-nesting gulls throughout the lower Great Lakes often conflict with human activities. We evaluated 5 nest disturbance techniques (nest-and-egg removal, egg removal, nest-and-egg destruction, egg destruction, and egg replacement) to reduce herring gull (*Larus argentatus*) and ring-billed gull (*L. delawarensis*) nesting in urban habitat, primarily roofs, in northern Ohio. Nest disturbance techniques were more effective in causing colony abandonment for ring-billed gulls than for herring gulls. Nest disturbance conducted for 1 year at an established ring-billed gull colony, and for <1 week at a newly established ring-billed gull colony caused abandonment. Nest disturbance conducted for 1–10 years did not cause herring gulls to abandon 5 of 6 established colonies; however, reductions were observed in annual maximum number of nests or eggs. Egg removal was at least as effective as nest-and-egg removal and required about 60% less effort. Egg replacement was the least effective of the techniques evaluated. Unless structural damage to buildings is of concern, egg removal is recommended over other nest disturbance techniques evaluated for inexpensive, long-term reductions of roof-nesting colonies. Nest-and-egg or egg destruction is recommended for ground-nesting colonies. Use of other control methods (e.g., habitat modification, frightening techniques) in addition to nest disturbance may increase the potential for colony abandonment.

**Key words** harassment, herring gull, *Larus argentatus*, *Larus delawarensis*, nest disturbance, ring-billed gull, urban-nesting, wildlife damage management

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Nesting populations of herring (*Larus argentatus*) and ring-billed gulls (*L. delawarensis*) have increased dramatically in the Great Lakes region of the United States and Canada in the past 30 years (Ludwig 1966, Blokpoel and Tessier 1986). Increased use of urban habitats (e.g., roofs) for nesting appears to be associated with these population increases (Blokpoel and Tessier 1986). For example, the number of roofs with nesting gulls in Cuyahoga County (including metropolitan Cleveland), Ohio increased from 1 in 1983 (E. C. Cleary, U.S. Dep. of Agric., unpubl. data) to 13 in 1994 (Dwyer et al. 1996). Nesting by gulls on human-made habitat now occurs throughout the lower Great Lakes (Blokpoel and Tessier 1991, Dwyer et al. 1996).

Increasing numbers of urban-nesting gulls have caused a concurrent increase in gull-people conflicts (Vermeer et al. 1988, Blokpoel and Tessier 1992). Gulls are often considered a nuisance and economic liability when nesting on buildings and other urban areas because they harass maintenance personnel, defecate on nearby vehicles, obstruct drain pipes and vents with nest material, and cause structural damage to buildings (Belant 1993). Gulls nesting on or adjacent to airports can also increase the likelihood of gull-aircraft collisions (Dolbeer et al. 1993).

Various techniques have been used to reduce gull nesting in urban areas (Blokpoel and Tessier 1992; Belant and Ickes 1996); however, few techniques have been assessed quantitatively for multiple years to determine their efficacy. Additionally, most control techniques have been used on ring-billed gulls, and not herring gulls. Our objective was to evaluate the efficacy of 5 nest-disturbance techniques (nest-and-egg removal, egg removal, nest-and-egg destruction, egg replacement) to reduce herring and ring-billed gull nesting in urban habitat, primarily on roofs.

## Study areas

The study was conducted at 8 nesting colonies in northern Ohio from April to July, 1993–1996. Because of different dates of colony establishment, access to sites, or knowl-

edge of colony locations, not all study sites were evaluated during all years (Table 1).

Sites in Erie County were the flat, gravel-covered roofs of American Quality Stripping and Chesapeake Display and Packaging Company, located 100 m apart and adjacent to Sandusky Bay, Lake Erie. Herring gull colonies at these sites were within 5 km of other herring gull colonies on breakwalls, roofs, and an island, which averaged about 2,900 nests annually from 1993 to 1996 (R. A. Dolbeer, unpubl. data). In Cuyahoga County, gulls nested on flat, gravel-covered roofs at ArgoTech, Ohio Crankshaft, Cotter and Company, and Goodyear Tire and Rubber Company and on a mowed grass field at Burke Lakefront Airport. Additional herring and ring-billed gull colonies located within Cuyahoga County averaged about 5,900 nests annually from 1995 to 1996 (J. L. Belant, unpubl. data). In Ashtabula County, 60 km northeast of Cuyahoga County, gulls nested on a mowed grass field at Pinney Dock and Transport Company.

Excluding Burke Lakefront Airport, all study sites had nesting colonies present for  $\geq 3$  years before nest disturbance. The colony at Burke Lakefront Airport was established during 1995, the same year nest disturbance occurred.

## Methods

Nest disturbance techniques were initiated when nesting was first observed (mid-April to mid-May) at

Table 1. One-day maximum and yearly total number of herring gull (HERG) and ring-billed gull (RBGU) nests or eggs destroyed for Chesapeake Display and Packaging Company (CDPC), ArgoTech (AT), Ohio Crankshaft (OC), American Quality Stripping (AQS), Cotter and Company (CC), Pinney Dock and Transport Company (PDTC), and Burke Lakefront Airport (BLA), northern Ohio, 1993–1996. Egg removal was not conducted at AQS in 1996.

Location	Species	Removal	1-day max. and (yearly total) No. of nests or eggs removed			
			1993	1994	1995	1996
CDPC <sup>a,b</sup>	HERG	Nests	86 (538)	70 (187)	41 (102)	27 (66)
AT <sup>a</sup>	HERG	Nests			115 (277)	92 (248)
	RBGU	Nests			771 (970)	0 (0)
OC <sup>a</sup>	HERG	Nests			67 (82)	0 (0)
AQS <sup>b,c</sup>	HERG	Nests	93 (716)	66 (191)	31 (77)	
CC <sup>c</sup>	HERG	Eggs			354 (888)	153 (506)
PDTC <sup>d</sup>	RBGU	Nests			2,500 (4,550)	800 (1,105)
BLA <sup>e</sup>	RBGU	Nests			1,908 (2,192)	0 (0)

<sup>a</sup> Nests and eggs were removed.

<sup>b</sup> Removals occurred at 1-week intervals during 1993, and at 3-week intervals during 1994–1996.

<sup>c</sup> Eggs only were removed.

<sup>d</sup> Nests and eggs were destroyed.

<sup>e</sup> Eggs were destroyed.

all colonies each year. We defined a nest as a structure with a well-defined bowl, fresh nest material (e.g., green vegetation), or eggs. We typically used maximum number of eggs or nests destroyed during a single visit each year to determine the effectiveness of the nest disturbance techniques.

### ***Nest-and-egg removal (herring gull [HERG] and ring-billed gull [RBGU])***

Nest and egg removal was conducted at nest sites on 3 roofs (Chesapeake Display and Packaging Co., ArgoTech, and Ohio Crankshaft) for 2 or 4 years (Table 1). Nests and eggs were removed at 1-week intervals in 1993 (Chesapeake Display and Packaging Co.) and typically 3-week intervals in following years at all locations. We changed to 3-week intervals to minimize visits to the roofs while insuring that no eggs hatched. Herring and ring-billed gulls have mean incubation periods of 26 and 28 days, respectively (Drent 1970, Ryder 1993).

During nest-and-egg removals, we recorded the number of nests present per species. Nest material from each removal was placed into 114-L plastic bags to estimate the volume removed. Typically, 2–4 people participated. Person-hours required to conduct each removal were recorded in 1993 and 1995 for removals at Chesapeake Display and Packaging Company.

### ***Egg removal (HERG)***

Egg removal was conducted at 2 roofs (American Quality Stripping and Cotter and Co.) for 2 or 3 years (Table 1). At American Quality Stripping, we removed eggs at 1-week intervals during 1993 and at 3-week intervals during 1994 and 1995. We recorded number of nests present on each visit. Person-hours required to conduct each removal were recorded in 1993 and 1995.

At Cotter and Company, eggs were removed at approximately weekly intervals from 22 May to 26 June 1995 and from 24 April to 11 June 1996 by Cotter and Company personnel. Number of eggs removed during a visit was recorded.

### ***Nest-and-egg destruction (RBGU)***

On 4 May 1995, we counted the number of nests with  $\geq 1$  egg at Pinney Dock and Transport Company. Pinney Dock and Transport Company personnel then destroyed all ring-billed gull nests using a rubber-coated steel roller (2.4 m long, 0.9-m diam) pulled by a tractor at 13- to 15-day intervals from early May to late June. In 1996, Pinney Dock and Transport Company personnel destroyed all ring-

billed gull nests at 6- to 14-day intervals from late April to late June.

### ***Egg destruction (RBGU)***

At Burke Lakefront Airport, nests with  $\geq 1$  egg were counted and then destroyed by stepping on eggs on 8, 10, 11, and 12 May 1995. From mid-May to June 1995 and from May to June 1996, Burke Lakefront Airport was monitored periodically for nesting gulls.

### ***Egg replacement (HERG)***

At Goodyear Tire and Rubber Company, eggs were replaced with plastic eggs (63.2 mm x 44.7 mm, filled 1/3 full with sand and painted tan with brown specks) at about 3-week intervals. Clutches of 2 and 3 eggs were replaced with 2 plastic eggs, whereas 1-egg clutches were replaced with 1 plastic egg. Goodyear Tire and Rubber Company personnel had conducted egg replacement since 1986, and provided egg replacement data for 1986–1994. In contrast to other sites, total number of eggs removed during a year was recorded.

## **Results**

### ***Nest-and-egg removal***

At Ohio Crankshaft, herring gulls abandoned the nesting colony following 1 year of nest-and-egg removal. In 1995, we removed 82 nests, and gulls continued nesting until late June. Herring gulls did not nest at Ohio Crankshaft in 1996 (Table 1).

At ArgoTech, nest-and-egg removal caused colony abandonment of ring-billed gulls but not of herring gulls. In 1995, we removed 970 ring-billed gull nests, and ring-billed gulls continued nesting until 12 June (Table 1). Ring-billed gulls did not nest at



Ring-billed gull nesting colony on roof in Cleveland, Ohio, May 1994. Note owl effigy in middle of colony. Photo by R. A. Dolbeer.

ArgoTech in 1996. In contrast, the maximum number of herring gull nests present during a visit declined only 20% from 1995 (115) to 1996 (92). Herring gulls continued nesting until late July (1995) and mid-June (1996). Additionally, from mid-May to mid-June 1995, the number of ring-billed gull nests declined >99%; the number of herring gull nests increased 5%.

Volume of nest material removed from ArgoTech was approximately 6,490 L (herring and ring-billed gulls) and 4,088 L (herring gulls only) during 1995 and 1996, respectively.

At Chesapeake Display and Packaging Company, 4 years of treatment did not result in colony abandonment; herring gulls continued to nest until late June or early July each year (Table 1). However, the maximum number of nests present during a visit declined 69% from 1993 to 1996.

Volume of nest material removed from Chesapeake Display and Packaging Company was 2,639 L in 1993 and declined 49% from 1994 (2,112 L) to 1996 (1,069 L). The removal of nest material and eggs averaged 3.6 person-hours per visit in 1993, and 2.1 person-hours per visit in 1995.

### **Egg removal**

Removal of eggs at American Quality Stripping did not cause colony abandonment during the 3 years of treatment; herring gulls continued nesting until late June or early July each year (Table 1). However, the maximum number of nests present during a visit declined 67% from 1993 to 1995 (Table 1). Visits to American Quality Stripping averaged 2.1 person-hours per visit in 1993, and 1.2 person-hours per visit in 1995, about 60% less time than reported for nest-and-egg removal.

Similarly, removal of eggs at Cotter and Company did not cause colony abandonment during the 2 years of treatment; herring gulls continued nesting until late June or early July each year. However, the maximum number of eggs present during a visit declined 57% from 1995 to 1996. An unknown, but low, number of eggs hatched in 1996.

### **Nest-and-egg destruction**

At Pinney Dock and Transport Company, the maximum number of nests present during a single visit declined 68% from 1995 to 1996 (Table 1); however, ring-billed gulls nested until late June each year. Pinney Dock and Transport Company personnel probably underestimated the number of nests destroyed during each nest destruction. For example, we counted 4,547 ring-billed gull nests with eggs on 4 May 1995 whereas Pinney Dock and Transport Com-

pany personnel stated they destroyed 2,500 nests on 10 May 1995.

### **Egg-only destruction**

On 8, 10, 11, and 12 May 1995, we destroyed eggs in 1,908; 119; 20; and 145 nests, respectively, at Burke Lakefront Airport. No nests were observed after 12 May.

### **Egg replacement**

At Goodyear Tire and Rubber Company, the number of eggs removed increased 62% from 1986 (216 eggs) to 1990 (349 eggs), then declined 87% from 1990 to 1995 (45 eggs).

## **Discussion**

In our study, nest disturbance did not cause herring gulls to abandon 5 of 6 established colonies. Ring-billed gulls abandoned 1 of 2 established colonies and 1 newly established colony after nest disturbance. However, Forbes et al. (1993) and Blokpoel and Tessier (1992) did not observe ring-billed gull colony abandonment at 3 locations after 3–6 years of nest-and-egg or egg removal.

The rate of colony abandonment may be influenced by availability of alternate nesting sites. Suitable, natural sites for nesting in the lower Great Lakes are limited (Blokpoel and Tessier 1992). Herring gulls did not abandon ArgoTech following 1 year of nest disturbance, but ring-billed gulls did, possibly because nest sites were available at an established ring-billed gull colony 11 km northwest of ArgoTech. We were unaware of similar alternate colony sites for herring gulls.

Although nest disturbance typically did not cause abandonment at established colonies, nest disturbance did reduce total number of nests or eggs present per year. Similarly, Forbes et al. (1993) observed an 82% reduction in ring-billed gull nests from 1991 to 1993, following nest disturbance. Blokpoel and Tessier (1992) found a 77% reduction in nests at 1 colony after 6 years of nest disturbance, and no reduction in nests at another colony after 4 years of nest disturbance.

Overall, nest-and-egg removal and egg removal were equally effective, and both were more effective than egg replacement. Nest-and-egg removal was about 60% more labor intensive than egg removal; however, removal of nests may reduce structural damage to roofs caused by nesting material. Although person-hours were not recorded for all nest disturbance techniques, nest-and-egg removal likely required more person-hours.

Unless structural damage to buildings from nest material is a concern, we recommend egg removal over other nest disturbance techniques evaluated for inexpensive, long-term reductions of roof-nesting colonies. We recommend nest-and-egg or egg destruction for ground-nesting colonies. Use of other control methods (e.g., habitat modification, frightening techniques) in addition to nest disturbance may increase abandonment (Blokpoel and Tessier 1992, Belant 1993). Nest disturbance, like other gull-control techniques, alone is unlikely to reduce the number of urban-nesting gulls in a given area (e.g., Cuyahoga County, Oh.), because gulls may disperse to recolonize nearby areas (see Belant and Ickes 1996).

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